QUITE UNLIKE THE PLEASURES OF SCRATCHING

THEORY AND MEANING IN ARCHITECTURAL FORM

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Recent critics of modernism have either mystified or denied the central issue of architectural theory: the analysis of order in architectural form. This has happened because there is a crisis in architectural theory itself, brought about by the divorce between theories of form and theories of meaning. This divorce has resulted from the mathematical bias of theories of form and the linguistic bias of theories of meaning.

This article reviews the arguments of two recent architectural critics, Roger Scruton and Alberto Perez-Gomez, and their respective philosophical sources, in an attempt to clarify — or, more appropriately, de-mystify — their violently anti-theoretical positions. By reviewing the writings of Plato, Vitruvius and Alberti — and showing how they have often been misinterpreted and misunderstood — the author suggests that architectural theory has always preoccupied itself with a rational description of form to show how architecture can be both intelligible and meaningful to us.

It is argued that the study of form and meaning can only be unified by a syntactic approach to the understanding of form itself, and only then can we begin to address the problems of form raised, but not solved, by Modernism.

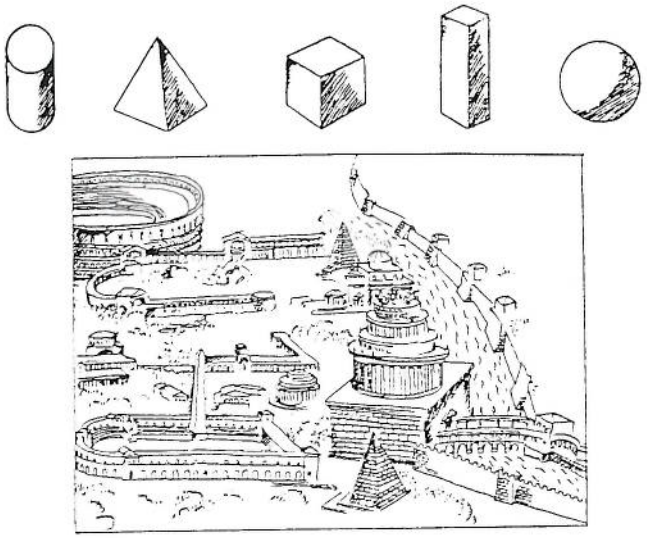
THEORIES AND MEANINGS

Theories are bundles of abstract, interrelated propositions that we use to give order to the evidence of our senses. They provide, as it were, an abstract picture of what the world is like, which we then use to interpret our concrete experience of it. Theories are closely bound up with the idea of *meaning*. What the world means to us is at least in part a product of the theoretical constructs that we bring to bear on it.

Now if twentieth century philosophy can be distinguished from previous times by anything at all, then I would suggest that it lies in the recognition that this link between theory and meaning applies to everyday life and commonsense as much as to science and philosophy. The sense that we understand the world — whether it is the physical world or the social and cultural milieu in which we live — depends on the theory-like constructs that we impose on our experience of it. Without theory, the world and everything in it, man-made as well as natural, becomes meaningless and unintelligible.

Two radical consequences follow from this insight, each providing a characteristic theme of twentieth century thought. The first is that science is seen as not unlike everything else that people think and do, but as having a natural continuity with it. As an activity, science is no more than a special extension of commonsense, in which we try to test our theories against experience, and where these theories are found wanting, to conjecture new ones and then test those. The epistemological claims of science thus rest not on some concept of *truth* but simply on more developed and better tested theories.

The second consequence is that if everyday life and culture carry social meaning for us through theory-like constructs, then it ought to be possible to investigate how this is so: how it is that everyday activities by which we 'read' culture — eating, building, dressing, interacting, and so on carry shared meaning for us. Or, put more precisely, what is it about the *form* of these activities



Le Corbusier: Towards a New Architecture, 1927

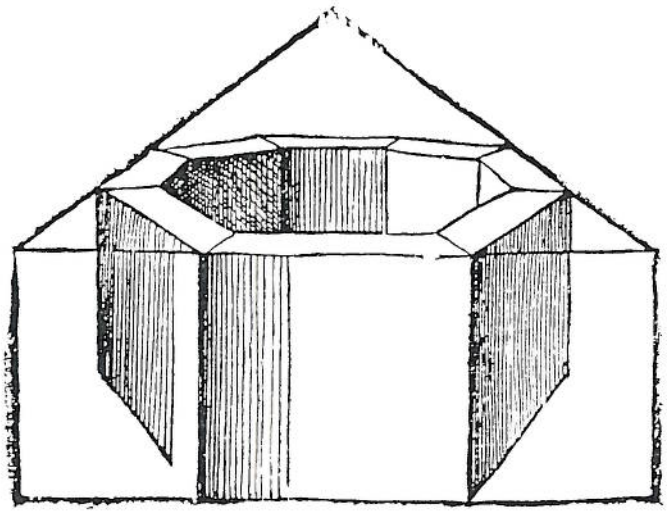
that makes them *intelligible* as parts of culture. The name for this intellectual project is 'structuralism'. It asks: can we give a *description* of these activities in such a way — necessarily an abstract way — as to show how it is that we can find pattern and meaning in our experience of them.

ARCHITECTURAL THEORY: THE CENTRAL THEME

Now any architect who had read his Vitruvius or his Alberti might well feel that he had reason to feel smug at this point, because architectural theory has always been 'structuralist' in this sense. The central aim of architectural theory — from Vitruvius to Le Corbusier — has always been to arrive at some description of the abstract principles underlying *order* in architecture, with the assumption that, once understood, these principles would also provide us with an understanding of how it is that people derive cultural meanings from architecture, and how they find it intelligible in the first place. In this sense, architectural theory has always attempted to link the everyday understanding of buildings with the problem of giving a formal description of them. Concepts like proportion, symmetry, composition, and so on, all have this double intention: of characterizing something about objective order present in architecture, and of providing insight to the theoretical perconceptions, that people must have in their heads if they are to read such objective properties as constituting a form of meaningful order.

It has usually been on this basis that architectural theory has tried to establish systems of precepts for 'good' architecture. In this sense, there is quite a remarkable continuity from Vitruvius through Alberti and Durand to Le Corbusier. With all their differences in style of thought and social context, the *Leçons* and the *Modulor* are a continuation of the classical project of finding and clarifying the intellectual bases on which formal order can be linked to intelligibility and meaning, and then using this as a basis for a prescriptive system of design.

But the thematic continuity in architectural theory is not confined solely to the prescriptive project. There are also common analytic foundations. It has always seemed self evident that if there is an underlying order to be found in the morphology of architectural form, then it must always be a *mathematical* order. Two possibilities have always coexisted, side by side. The first is based on numbers, and rests on the simple proposition that order in architecture arises from regularities in the ways in which we can combine numerical ratios with each other. Theories of proportion and modularity belong to this category. Ultimately, they are based on the 'Pythagorean' idea that order in *nature* — and especially in musical sounds — is founded on regular ratios that can be expressed as relations between whole numbers. In this way, numerical theories of



Octagonal ring in perspective, from Serlio's "Sesto Libri..."

order are proto-scientific: they postulate an underlying numerical order in nature, and propose to reproduce it in the man-made world of architecture.

The second possibility is based on geometry, and rests on similar epistemological foundations, though in this case the ultimate authority is Plato's theory of the geometrical nature of the 'deep structures' of the physical world. Again its central proposition is that nature exhibits an underlying *geometrical* order, and it is this that we should seek to emulate in architecture. Once again, the theory is quite explicitly proto-scientific in its postulation of an underlying, describable, mathematical order which ought to be imitated in architecture.

Two rather different kinds of theory of architectural order arise from these mathematical possibilities. On the one hand, we have theories of how good architecture may be *generated* by a step by step process, following given rules. Modular and proportional theories are essentially of this kind: we might call them theories of the 'genericity' of order, noting that they say little about the final form of the building, but deal with the process of its formation. On the other hand, we have theories of what the *final form* of the building should be like — a state description, perhaps, rather than a process description of how we should arrive at the form — which tend to be of a geometrical rather than a numerical nature.

These two types of theory do interact. For example, the golden section founds a geometrically based theory of proportion, and therefore of genericity. Indeed, the almost mystical status of the golden section may be to do with the fact that it alone proposes a theory of order that is at once a theory of genericity *and* a theory of geometrical form.

Both types of theory, however, tend to lead a single profound difficulty, one which may have prevented either theory from making significant progress over the past two thousand years. It is this. If the underlying order in the physical world is mathematical, and the aim of architecture is to reproduce it in buildings, it then follows that the order we are trying to impose on buildings is a *natural* order, rather than a social order. In so far as we try to identify the abstract principles of architecture through mathematics, we are by implication *naturalizing* — and thus *de-socializing* — the notion of order in architecture. We find ourselves required to believe in eternal verities of form, rather than cultural and social relativities.

In at least one sense this flies in the face of common sense. it leads us to expect that our reading of architectural form will be indifferent to cultural meaning. But this is not the case. the degree and type of formal order a building possesses is one of the first clues we have to its social and cultural nature. We read buildings not as objects which remind us of the order of nature but as objects that bring forcibly to mind the order of culture. It seems unlikely, then, that mathematical theories can be telling the whole story, since they lead to theories that *remove* architecture from our *cultural* reading of it. In effect, they divorce the theory of order from the theory of meaning.

There is, unfortunately, an escape from this fundamental difficulty, one that has been often taken in the history of architectural theory. It is to argue that cultural meaning in architecture resides not in the form itself, but in the way in which that form is elaborated and decorated by *figures* of various kinds (to borrow Alan Colquhoun's useful expression [1]): that is, by characteristic ways of handling and relating constructional elements, openings, and so on. Figures are so clearly influenced by historical periods as to leave their 'cultural relativity' in no doubt. They can therefore act in a way comparable to rhetorical 'figures' in creating a sense that social meaning is being transmitted. The classical orders are themselves the prototypes of this concept of meaning.

A direct consequence of this apparent solution to the difficulty is that the notion of meaning in architecture is historicized and made dependent on the contingencies of historical developments, such as constructional techniques or modes of production. It is this, I believe, that has rendered the study of architectural meaning so intractable. It has led architecture to fall prey again and again to the linguistic analogy [2], in which the false hope is set up that architecture will recover meaning by first identifying the word-like units that make up architecture, then establishing what they mean, and then showing how they may be combined into sentences to convey cultural meanings. Why the linguistic analogy is false to architecture — and why it has always failed to deliver even a fraction of its promise — requires us to penetrate a little more deeply into what we mean by *meaning*.

SIGNIFICANCE AND SIGNIFICATION

The notion of meaning, in architecture as elsewere, raises two quite distinct possibilities which we might sum up as the difference between *significance* and *signification*. Theories of *significance* are those where architecture is held to refer first and foremost to itself, to its intrinsic nature as architecture, as an instance of the field of ordering possibilities that we call architecture. Theories of *signification* are those where architecture is held to stand for something other than itself: power, religious ideals, social statuses, and so on. We might say, more succinctly, that significance is about *syntax*, that is, about shape, form and pattern in architecture as a thing in itself; whereas signification is about *semantics*, that is, about the extrinsic domains of meaning that are awakened as a result of that syntax.

We may also say that in architectural theory — as we have inherited it — the question of significance is dealt with mainly through the mathematical preoccupation with *form*, while the question of signification is dealt with primarily through the linguistic preoccupation with *figure*. This is as disastrous as it is illogical. The field of architectural theory — focusing as it must on the analysis of form and meaning — is, in effect, split into two irreconcilable camps; neither of which can make contact with the other, and neither of which can progress without the other. Common sense would suggest that a theory of the social signification of architecture can only be based on a theory of its significance in itself in the first place. We must, if you like, have a theory of how architecture can mean anything at all before we can have a theory of what architecture might actually mean. Yet the epistemological split between the two camps precludes any such possibility.

SCRUTON'S CRITIQUE OF ARCHITECTURAL THEORY

The theoretical impasse that architecture has engineered for itself has had the effect of rendering it highly susceptible to external attack. Roger Scruton, for example, in his *The Aesthetics of Architecture* [3], can, as a philosopher, mount an attack which is not only an attack on Modernism in architecture, but also an attack on the whole idea that architects can, by the rational analysis of architectural objects, arrive a better understanding of what order in architecture comprises, and how, therefore, it has meaning for us. It is, in other words, an attack on the possibility of even having a theory of architecture.

Scruton's attack is quite comprehensive, and he exploits the very weakness of architectural theory that I have described. For example, he attacks all architectural theorists who have tried to objectivize the understanding of form, through concepts such as proportion, symmetry, and so on. The meanings of these terms, he argues, in so far as they apply to buildings at all, do not refer to the *form* of the building, but to its detail. Architectural theory — which he defines contemptuously as *'usually the gesture of a practical man unused to words'* [4] — has been mistaken in trying to find meaning through the abstract, rational analysis of architectural morphology. 'Appropriate' detail is all that is involved, since architecture is neither art nor science but simply an expression of polite and decorous behaviour, like laying tables or knowing about wine.

But Scruton wants to go even farther than saying that the analysis of built form is useless; he wants to show that it is also *philosophically* misconceived. Rational enquiry into architecture, he suggests, should be aimed not at architectural *objects*, but at the nature of our *experience* of those objects, since: *'...concepts like the appropriate and the beautiful... take their sense not from the objects to which they are applied, but from the state of mind which they serve to articulate.'* [5] *and 'the concept of the 'appropriate', like other concepts which articulate aesthetic response, eludes explicit definition'* [6].

In arguing this, Scruton is of course repeating a major principle of Kantian aesthetics, which properly argues that terms we use in order to espress *judgements* about objects should not be thought of as properties of those objects themselves, but as aspects of the way in which we think about them.

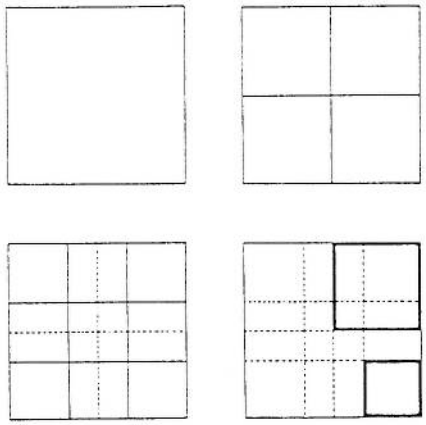
Now, Scruton wants us to extend this principle to concepts like 'proportion'; that is, to treat it as a word which describes our experience of objects themselves. This is not because he regards the concept as unimportant. Far from it: *'... it is precisely because proportion is so aesthetically fundamental that we should beware of tying it down to an explicit definition'* [7]. But *'... there is never any need, in the practice of aesthetic judgement, to say what 'proportion' really means in the sense of pinning down the term to some one property or set of properties which provide its true aesthetic sense'* [8].

It is here that the limitations of Scruton's ingenious attack suddenly show themselves. Of course there is no need to define terms like 'proportion' in the practice of *aesthetic judgement*. But what about the practice of *design?* Can the designing architect — who, after all, is responsible for giving Scruton his experience — be satisfied with purposely undefined terms that articulate his own feelings more than they articulate the properties of the buildings he is designing? The contrary is surely the case. The bane of architectural theory is that it can turn the intuitive insight of the mind experiencing architecture into a reflective and descriptive comment on architecture itself. In design, the striving for rational understanding does not result — as Scruton seems to think — from a naive and overweening desire to reduce the world to a codified system, but from the simple need to be able to create new experiences.

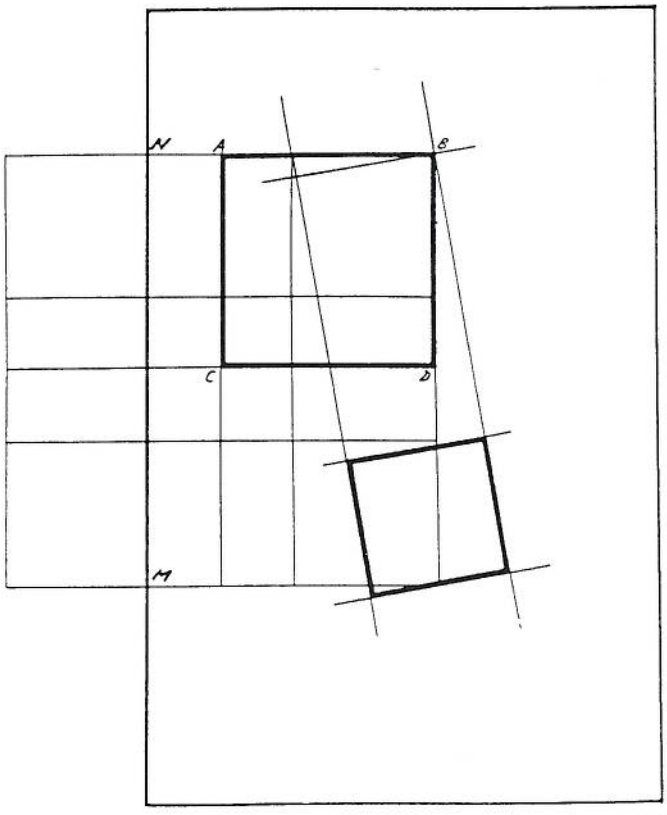
Scruton eventually shows up the paradox in his argument himself: *'What is meant by proportion can be understood as we have understood the concept of the appropriate. Proportion is exhibited by a building whose parts — judged in terms of their shape and size rather than in the terms of their ornamentation — provide visual reason for one another'* [9].

'Provide visual reason for one another'? Surely, this is a trick of words if we are meant to infer that such provision is only an aspect of judgement, and not in the least an aspect of buildings. If it is an aspect of buildings, then the entire problematic of architectural theory rises before us, since the expression can only refer to some *abstract configurational property of the form itself* and cannot, by Scruton's own account, be reduced to a matter of 'appropriate' detail. The whole aim of architectural theory has, one might say, always been to try to find out what this type of expression means in terms of designable buildings.

In the final analysis, then, Scrupton's philosophy is not only useless to the architect but also bizarre. He opposes the rational analysis of the architectural object on no better ground, so far as I can see than that he is a Kantian philosopher of mind. More strangely still, he tries to recruit Alberti — on whom Scruton is an aknowledged expert — to his obscurantism. I have always found



Malevitch, suprematist composition; red square and black square, 1915; New York, MOMA



Schematic analysis of geometrical construction of malevitch's composition of 1915

Alberti particularly clear in opposing the points that Scruton would need him to make. *'The parts', Alberti* writes in a well-known passage, *'of which architectural forms consist are lines, angles, extensions, and the like'* [10]. For him, these abstractions must be considered first *'for it is undeniable that there may be, in the mere form or figure* (meaning overall configuration) *of a building an innate excellence or beauty, which strikes and delights the mind where it is perceived as much as it is missed where it is not.'* And, as though reproving Scruton in advance for subordinating form to detail, he goes on: *'We should erect our buildings naked and let it be quite completed before we begin to dress it with ornament'* [11]. And, as though to confirm the modernity of his structuralism he adds: *'But the judgement which you make that a thing is beautiful, does not proceed from mere opinion, but from a secret Argument and Discourse implanted in the Mind itself'* [12].

THE PHENOMENOLOGICAL CRITIQUE

An even more extreme attack on the rational analysis of architectural form has also come recently from a very different philosophical quarter; phenomenology, with the publication of a book by Alberto Perez-Gomez titled, after Husserl, *Architecture and the Crisis of Modern Science* [13]. Actually, the book is not about science at all, but about geometry in architecture, and its relation to meaning, or, more precisely, the loss of meaning. Perez-Gomez holds a kind of 'lost innocence' theory of architectural meaning, with science as the leading ravisher. According to Perez-Gomez, until the advent of science *'... Architectural intentionality was transcendental, necessarily symbolic'* [14], and *'Geometry and number, prototypes of the ideal, since time immemorial have been symbols of the highest order* [15].' But: *'... the 'new science' of Galileo... implied a radical subversion of the traditional astrobiological world view... and ...pretended to substitute for the reality of the live world, infinitely diverse, always in motion, and defined essentially by qualities, a perfectly intelligible world, determined exclusively by its geometrical and quantitative properties'* [16]. Gradually, with Durand playing the role of Mephistopheles, the symbolic geometry of the 'mythical ancient world embodied in the writings of Vitruvius' [17] came to be debased to a mere *'instrument for the control of technical operations'* [18]; while *'... things became numbers, not understood as their Platonic or Pythagorean transcendental essences, but as objective and intelligible forms'* [19], and, in the final analysis it was all due to the fact that *'... the new science of Galileo postulated the initial split between the perceptual and the conceptual spheres of knowledge'* [20].

On the basis of this analysis, Perez-Gomez condemns all rational and abstract analytic thought about architectural form, whether *'typological or morphological'* [21] as leading away from an understanding of meaning. The argument is one that will appeal immediately to many. The idea that the prosaic, materialistic world of today has somehow forced out of architecture a direct experience of deep symbolic realities, will strike a chord, and not only among those who feel intellectually dispossessed by science. Even more appealing is the promise that the revival of some archaic (and arcane) geometric symbolism might save architecture from modernist functional shapelessness.

The trouble is that none of it is true. The world of symbolic geometry cannot be found in the writings of Vitruvius. Nor can the rake's progress of rational thought that Perez-Gomez describes be found in the history of philosophy and science. As with Scruton, Perez-Gomez's ideas (as his title suggests) are derived more from philosophical principle than analysis of evidence. To undestand this particular line of attack on rationality we must understand the strange — and strangely persistent — early twentieth century philosophy of *phenomenology*.

Phenomenology, in the sense that Perez-Gomez means it [22], was developed by Edmund Husserl in the early part of the twentieth century. Husserl was nothing if not ambitious. Like other philosophers he thought that it was the job of philosophy to attend not only to what we think of, but also to the mental and conceptual apparatus we think *with*. Like others, he saw that the 'evidence of our senses was a product of the theoretical frameworks, we use to obtain it. But, unlike others, he thought that the problem could be overcome, not by analyzing these frameworks, but by *by-passing* them.

This was to be done by what he calls 'bracketing' or 'suspending the natural attitude', natural attitude meaning the simple-minded way in which we take our everyday perceptions and concepts for granted. Bracketing can be explained quite simply. If I write "I see you", then we are likely to take for granted what I mean. But if I write "I *'see'* you", then to whatever was previously meant is added (through the inverted commas) that I call into question what the word *'see'* means. By applying this trick to everything, Husserl thought that he could arrive at "pure essences" or "pure phenomena" which were free of presuppositions and independent of conceptual frameworks. Then, on the basis of these "pure phenomena" he would erect an *a priori* (that is, prior to experience) *science* of cognition, which would act as a kind of master science and compel the rewriting of all the existing sciences, such as physics and biology. To use his own words: *"the term 'phenomenology' designates two things: a new kind of descriptive method which made a breakthrough in philosophy at the turn of the century* (a somewhat immodest claim, since he invented it himself!), *and an a priori science derived from it; a science which is intended to supply the basic instrument for a rigorously scientific philosophy and, in its consequent applications, to make possible a methodological reform of all the sciences* [23]".

Husserl thus combines an almost Frankenstein-like belief in the possibilities of his super-science with a fundamental attack on all existing sciences for their allegedly naive and 'positivistic' view of phenomena and rationality. It is, of course, only the latter anti-scientific stance that writers like Perez-Gomez take up in order to support their attack on rationality. He points to the existence of a philosophy which is supposed to have demonstrated the inadequacies of science, and argues that this is because science and *meaning* are incompatible with each other. It would obviously be very inconvenient to such an argument if the founder of the philosophy were in fact arguing that we should replace the existing sciences with a single super-science of his own. This suppression of the 'other half' of Husserl does, however, have the useful effect of making the philosophy look less crazy than it actually is.

The whole argument would collapse if science were not 'positivistic' in the sense of being naive about the relation between thought and reality. And, of course, it is not. The whole aim and justification of science has always been to call into question our existing theoretical constructs about the world, and, where possible, to try to conjecture and test new and better ones. The starting point of science therefore, is the same as Husserl's: the realization that our theoretical presuppositions are not reliable guides to what the world is actually like. Where Husserl differs from science is that he thinks some kind of ultimate *truth* is possible, whereas science continues to rest on theories for its 'piles in the swamp [24]'. Phenomenology is, probably, the last refuge of the old idea that there might be a scientific certainty to replace old certainties of religion — and presumably this is why the philosophy is so attractive to those with a mystical turn of mind (including many on the extreme right), where the uncertainties of mere theory are unacceptable. Whether or not this is true, Perez-Gomez's argument is phenomenological not only in that it criticizes scientific rationality but also in that it proposes some ultimate architectural truth, while remaining appropriately vague as to where this truth might be found.

But even more damaging to Perez-Gomez's case against rationality is that this *'mythical ancient world'* of pure geometrical symbols seems to be entirely imaginary. One can search the *Ten Books* of Vitruvius [25] from cover to cover (in which the 'mythical ancient world' is said to be found) and discover not one single reference to the *symbolic* importance of geometry, nor, indeed, to the symbolic importance of anything. There are, in fact, only three references to geometry in Vitruvius, (his concept of proportion being entirely of a modular or numerical nature). The first reference is where he advocates the use of 'brazen gnomons' to decide the layout of streets in a new town, but not with any hint of symbolic intent, but merely to optimize (and I use this contentious term after much consideration) the *'shutting out of winds'*. [26] The second is where he describes how both a square and a circle can be derived from the outstretched human body — as depicted in his well-known diagrams — but from this he derives not an argument for geometry, symbolic or

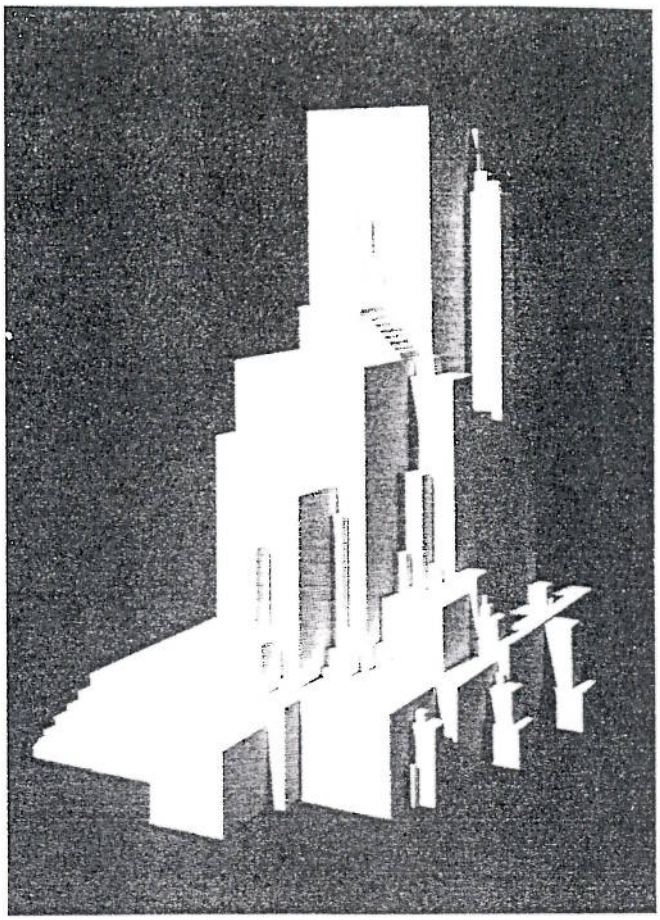
otherwise, but an argument for proportion.[27] In his third reference, he does actually refer to Plato and Pythagoras, first to *'the very many useful theorems of Plato'* which he saw as useful in solving dimensional problems of layout; and then to the theorem of Pythagoras, which *'affords a useful means of measuring many things, and is particularly useful in the design of staircases in buildings, so that the steps may be at the proper levels'*.[28]

In other words not only are geometry and number not used symbolically in Vitruvius, but, on the contrary, he does with them exactly what the moderns are accused of doing: he uses them as an *'instrument of control of technical operations'*.[29] The point his hardly worth labouring. Vitruvius is a rabid functionalist, and his *Ten Books* read more like the back pages of the *Architects' Journal* than the poetic embodiment of a lost mystical world. Even the personality of Vitruvius, projected through the short introductory vignettes he writes for each book, is thoroughly modern. He makes it quite clear that one of his main aims in writing a learned treatise is to show how deserving he is of more work than has so far come his way.[30] In the centre of the supposed 'mythical ancient world', there is Vitruvius, touting for work.

PLATO AND INTELLIGIBILITY

It is hard to see how Perez-Gomez could have misread Vitruvius so badly. But is easier to forgive him for his misreading of what we might call the philosophy of geometry, since many myths on these matters already exist and dominate architectural discourse. First among these myths must be the strange — yet persistent — misunderstanding of 'Platonic solids'. The 'Platonic' or 'regular' solids — so-called because all their faces are congruent — are the tetrahedron, the octahedron, the hexahedron, the dodecahedron and the icosahedron, forms with relatively little visual interest and certainly of little direct use in the construction of architectural forms. They are known as the 'Platonic' solids not because Plato discovered the fact that only five regular solids were possible (the proof is in Euclid, but its origins are unknown) but because Plato used them in his *Timaeus*, in relation to the theory of the *'four elements'* of earth, air, fire and water, to construct a theory of the micro-structure of matter. The theory was very simple, and extremely physical. Since all four elements behave differently, he argued, they must be constituted of different building blocks. Since there are only a few 'regular solids' then it is likely that different types of matter are built from different solids. *'Let us assign the cube to the earth'*, he says, *'for it is the most immobile of the four bodies, and the most retentive of shape, and these are characteristics which must belong to the figure with the most stable faces... while similarly we assign the least mobile of other figures to water, the most mobile to fire, and the intermediate to air. And again we assign the smallest figure to fire, the largest to water, the intermediate to air; the sharpest to fire, the next sharpest to air, and the least sharp to water. So to sum up, the figure which has the fewest faces must in the nature of things be the most mobile, as well as the sharpest and most penetrating'*.[31] Even these snippets make the structure of Plato's reasoning clear. It is basically about the number of faces and the degree of slipperiness, from which he infers the different behaviours of different types of matter. It is a very practical and down-to-earth theory, with no whiff of symbolism. How architectural theory managed to go from here to the idea that 'Platonic' solids were spheres, circles, cones and cylinders, and the like — as is still repeated in many architectural primers on architectural form, too many to enumerate here — and as such constituted the visual and symbolic elementary forms of architecture is a mystery which some more diligent architectural historian may eventually unravel. It would be, at the very least, an instructive study in the persistence of error, and would certainly lead to the conclusions that at least some well-known names who talk about Plato had not troubled with the actual texts.[24]

The source of the original confusion might perhaps lie in the text where Plato actually does talk about geometry from an aesthetic point of view. It occurs in the *Philebus*, and even there his formulation is remarkably prosaic: *'Straight lines and circles and the plane or solid figures that are formed from them by turning lathes, rulers and measurers of angles... these I affirm to be not only relatively beautiful, like other things, but absolutely and eternally beautiful, quite unlike the pleasures of scratching.'*[23] Turning lathes? Measurers of angles? Scratching? It is all a great way from mystical geometry and 'transcendental essences' that Perez-Gomez, and others, have found in these forms.



Malevitch, 3D model

In fact, a much more interesting, and properly 'Platonic' suggestion is being advanced: that there is a connection between our knowledge of a form and knowledge of what we might call the *genetic construction* of that form. It brings to mind a much more modern formulation on the nature of perception, due to Jean Piaget: *'To know is to construct or reconstruct the object of knowledge in such a way as to capture the mechanism of that construction'*[34] — a syntactic rather than a semantic theory of knowability.

I call this formulation Platonic because the essence of Plato's argument concerns how it is that the world is *intelligible* to us, that is to say, how the perception of the physical world is created by an *a priori* 'conceptual' world; once again, it seems that Perez-Gomez has got it completely wrong — the whole force of Plato's argument about the mind and the world is to show the primacy of the conceptual over the perceptual. The Platonic theory of 'forms' is, in fact, about this intelligibility, and to think of them as 'transcendental essences' is simply an error.[35]

Plato's theory of form arises in the first place from a very simple problem in everyday life. In language we use both *particular* and *universal* terms. A particular term is 'bird', as in 'that bird flies'. We may point to the bird and indicate it as we say its name. A universal term is 'birds' as in 'all birds fly'. 'Birds', in this case, cannot be indicated, since what is referred to is the class of all birds, whose locations are for the most part unkown to us. 'Birds' is therefore an abstract concept. One would suspect it of being a pure mental construct, were it not for the fact that it seems to depend on some abstract notion of a bird, which somehow sums up 'birdness', yet it is present in all real birds, regardless of their individual variation. 'Birds' seems to imply some kind of 'bird genotype'. These genotypes are, in effect, Platonic *forms*. We cannot argue that they are purely mental constructs, since they seem to de-

pend on and interact with physical reality. Yet we cannot doubt that, in some senses at least, the bird 'type' is real enough, even if it exists as an abstraction.

If this is the case for birds, then we can easily imagine how much more difficult it is when we talk of circles rather than birds. What is a circle. Hardly a real one, since all of those must be imperfect? Knowledge of how to generate a circle? This won't do, because it says nothing about the final form which encapsulates at least part of our knowledge of circles. Is it purely a mental construct? Hardly, since circles are real enough. We have to accept that 'circleness' is somehow present in all these, but none has precedence in defining what a circle really is. We have to conclude, therefore, that the *theoretical possibility* of a circle is somehow at least as 'real' as any imperfect circles we might make, or any mental conceptions of them we might have. These abstract possibilities are, again, Platonic 'forms'. They are not mystical essences, but deductions from the dominant epistemological problem of our existence as experiencing subjects. Without such abstractions, the world would cease to be intelligible to us. Forms express the dominance of the perceptual by the conceptual and try to explain the intelligibility of things.

Plato's theory of knowledge is then really about three things: the idea of genotypical *forms*; the idea of the *genetic construction* of these forms; and *intelligibility*. It is clear that each of these ideas corresponds to one of the central interests of architectural theory. It is also clear that the Platonic concepts which have influenced architectural theory are not these, but naturalized mystifications of them; the mystification from the *Timaeus* and the symbolic mystification by the misreading of the idea of forms.

IS THERE A LOGIC OF ARCHITECTURAL FORM?

What then follows for the understanding of the relation between theory and meaning in architecture today? Let us review the argument so far. First, I argued that the notion of meaning, in architecture as elsewhere, depended on pre-given theoretical constructs, and that structuralism was about the understanding of these constructs and how they permitted us to impose meaning on and derive meaning from artefacts. Then, I argued that architectural theory had always been structuralist in this sense, since it was centrally concerned with the relation between order and intelligibility. Unfortunately, I argued, the dominance of the mathematical paradigm of order had the effect of 'naturalizing' the study of meaning, the latter being dominated by the linguistico-historical paradigm. In isolation from each other, neither branch of theory had progressed.

Next, I looked at two recent attempts to take advantage of the weakened state of 'structuralist' architectural theory, one to demolish it altogether (Scruton), the other to force it to retreat into mysticism (Perez-Gomez), both in the service of different philosophies. I have argued that both attempts have failed, the former because the analysis leads straight back to the structuralist problem of form, and the latter because it leads us back to Plato, where we saw that both 'Platonic' ideas that had dominated architectural discourse — the idea of geometrical symbols, on the one hand, and the Timaen geometrical theory of matter, on the other — were illegitimate borrowings in the task of explaining order and intelligibility in architecture. On the contrary, it has been argued that each has constituted a different kind of mystification of the problem, the first a symbolic mystification, the second a naturalistic one.

But once these mystifications were cleared away, the central issues of architectural theory remain profoundly Platonic — in the real sense of the word; that is, how to describe order in form, both through its intrinsic nature and through its genetic construction, in such a way as to show how form carries intelligibility and meaning. Is there an alternative approach, then, one which dispenses with mystifications — both symbolic and naturalistic — but retains the notions of intelligibility, genotypical forms and genetic construction.

I suggest there is. The gist of my argument — which can only be roughly sketched here — consists of two propositions. The first is that the formal terms which we use to describe architectural form – proportion, symmetry, composition, rhythm, and so on — do not rest on some unarticulated mathematical foundation, but are essentially *relational* terms. They refer simply to the variety of ways in which parts can be related to other parts, and to wholes. As such, their essential nature is logical rather than geometrical or numerical, and what we read as the intelligibility of form is, in the first instance, the *relational logic* or syntax of that form. The *significance* of form (ie. how architecture refers to itself) is thus, in the main, a matter of its relational syntax.

The second proposition is that *social signification* of form (ie. how architecture carries meaning) arises, in the first place, from the different types of elementary logical relations that are possible in the construction of architectural form. These elementary differences lead to different modes of constructing *complexity* in form, and these different modes will always carry with them the significatory potential of the types of elementary relation that dominates their syntax. The signifying potential of form will then depend on three factors: the *type* of relational syntax used; the *degree* to which syntax is used; and the degree to which *mass* is invested in particular syntactic relations — that is, a large mass invested with certain syntactic relations will read differently from a small mass invested with similar relations.

What these elementary relational ideas might actually entail can be explored by considering the common concepts which we use to describe form. Take symmetry, for example, in its simplest manifestation of bi-lateral symmetry, as in Laugier's primitive hut. Symmetry might itself be thought to be one of the 'elementary' concepts we are seeking. But it is not. It is a complex concept containing two quite distinct ideas. The first is the idea of *congruence*, meaning that the two components of a symmetrical object can, in principle, be overlaid on each other and found to be the same. It is important that the property of congruence is quite independent of space. Objects are or are not congruent regardless of where they are located in space in relation to each other. Congruence is thus a *logical* notion, rather than a spatial one [36]. The second idea covers what is omitted by the notion of congruence: that of a certain kind of *spatial relation:* namely that the relation of one component of the symmetrical object to the other — ie. of one sub-object to the other — is the same as the relation of that sub-object to the first. This seemingly tautological property is precisely what is meant by symmetry in mathematical relations; that is, that *a* is to *b*, as *b* is to *a*. Once again, this is primarily a *logical* idea, even though it is one which is realized through spatial relations. The spatial relation is one instance of the more general abstract relation, *a:b::b:a*.

Thus the idea of bi-lateral symmetry, which to us (though not to Vitruvius) appears as a mainly geometrical concept, is also a rather complex syntactic idea, defining that to mean the logic of relations: parts of a whole that are congruent to each other are also in a spatial relation to each other in such a way that the relation of each to the other is identical. One might argue that the idea of 'sameness' or congruence is applied twice; once for the parts of the whole, and once for their relation.

What is the advantage of this definition. First, a logical description of form is a description of something like its 'genetic construction'; how it is put together in such a way as to be intelligible to us. If refers at once, therefore, to the properties of the symmetric object itself — its own formal laws of construction — and to the mental operations by which we *'retrieve a description'* of it [37].

Secondly, once the logical components of the definition are separated, then each can clearly be used independently without any loss of intelligibility. For example, noncongruent parts can be placed in a non *a:b::b:a* relation, and remain readable as exactly that. In short, the logical ideas can be permutated and combined to form *logically* more complex and differentiated forms.

Third, we can see that using different combinations of logical relations would create different *types* of order, and at the same time, the degree to which the logical relation were applied to aggregates of parts would vary the *degree* of order which appeared to be present in that object. Thus one could characterize the kind of 'organic' conglomerate form of, say, hill villages as possessing a low degree of this kind of order, while at the opposite pole we would find highly geometricized forms, such as Renaissance Ideal Towns, which possessed a strong degree of this kind of order.

Fourth, we can see the relations among the standard terms in use in architecture to describe form, and show that these relations are quite systematic. For example, the notion of proportion invokes the notion of metric congruence of parts without invoking the notion of particular kinds of spatial relations. Conversely, the notion of composition invokes the notion of certain kinds of spatial relation, without necessarily invoking the idea of congruent elements — although in practice, of course, either term might be used in such a way as to imply the other. Similarly, the notion of rhythm implies a certain periodicity of congruence, again without necessarily invoking particular types of spatial relation.

Finally, we may easily see through this form of logical analysis how it comes to be that this logical order is either a numerical or a geometrical one. Numerical, or modular, theories are always based on what Vitruvius called *analogia* or *'correspondence among measures'* [38], and so appears easily as an arithmetical idea. But, as has been confirmed by many theorists, including both Vitruvius and Scruton, a violation of arithmetical accuracy is not a violation of architecture. This is simply because the relational, or syntactic, idea implied by modular theories can easily survive, and even gain from, metric adjustments. As Vitruvius says: *'The first thing to settle is the standard of symmetry* (ie. the module), *from which we need not hesitate to vary'* [39].

The nature of geometry in architectural form can, therefore, also be made clear. Forms are geometrical to the extent that certain kinds of congruence and certain kinds of spatial relation are used in order to clarify the structure of whole patterns at the expense of the identity of its parts. What we might call 'geometricity' in architectural form is not therefore the *basis* of order, but is itself a *special kind of order.*

But this would only be the case where the concept of geometry implied first and foremost a geometric relation among well defined elements in a composite whole. The idea of a pure geometrical form as defining the overall shape of a building is quite different, and in some ways the opposite, since it implies that geometricity arises not from certain relations among constitutive elements, but, in all likelihood, from the lack of such relations, since that would limit the legibility of the pure geometric form of the whole. In this sense, the use of pure geometric forms can be seen as a means for eliminating the forms of social signification associated with the modalities of formal syntaxes.

If this is the case, then it is possible to discern a profound relation between the two dominant formal notions of Modernism in architecture: that form itself is *geometrical in a pure sense;* and that form arises from *function.* Both are quite clearly ways of *naturalizing*, and in effect desocializing, form. The notion of function naturalizes the *genesis* of form, that of geometry the nature of *form itself.* In this sense, the apparently contradictory combination of concern for architecture as sculpture and of architecture as utility are unified as a determination to break with the inheritance of the past by breaking the link with the constitutive social syntax of architectural form. Hence the fundamental — and I believe unviable — modernist intellectual project of trying to establish determinative relations between geometry and function as a means to rational architecture.

Leaving aside the viability or otherwise of the intellectual project, the question for design remains: how far was this attempt to work *outside* the social logic of form effective? Is form thereby truly naturalized and de-socialized? Or does it, through its often unintended reflections of the syntax of form, continue to transmit the social message embedded in its elementary logic? It would seem that the ordinary experience of form now confirms that the social logic of form is not avoided by an *intention* to naturalize it, but persists through the nature of form itself. Buildings are judged to be 'monolithic', or 'bureaucratic' or 'capitalistic' regardless of the sculptural intention of the designer. And if we cannot side-step the social nature of form, then it would seem that we have no alternative but to understand it.

The ideas in this article owe a great deal to my discussions with students over the past few years, including Patrizia Zanella and David Chou; Helen Tsoskounoglou, and Richard Burdett; but especially to my discussions with Andreas Kourkoulas.

1 A Colquhuon: Form and Figure, in *Essays in Architectural Criticism*, Oppositions Books, 1981

2 A useful review of the linguistic analogy can be found in P Collins: *Changing Ideals in Modern Architecture*, Faber, 1965: it is instructive that Collins, writing in the mid-1960s, can view the language analogy as being out of fashion, especially so since from that time it has totally dominated the discussion of meaning in architecture through the influence of semiology. See also, M Krampen: *Meaning in the urban environment, Pion, 1979*

3 *R. Scruton: The Aesthetics of Architecture*, Methuen, 1979. Chapter 3, 'Has architecture an essence?' is particularly relevant to his case against theories of architecture.

4 ibid, p 269

5 ibid, p 234, (Chapter 2, note 9)

6 ibid, p 227

7 ibid, p 69

8 ibid, p 235

9 ibid, p 235

10 Leon Battista Alberti: *De Re Aedificatoria*, Florence, 1845; translation by James Leoni, published by subscription, Book IX, Chapter 8, p 202

11 ibid, p 203

12 ibid, p 194

13 A Perez-Gomez: *Architecture and the Crisis of Modern Science*, MIT, 1983. The title is adapted from E Husserl: *The Crisis of European Sciences and Transcendental Phenomenology*, and his: *Phenomenology and the Crisis of Philosophy*. No specific references are, however, made to these texts by Perez-Gomez, and the dates given are those of the English translations rather than of the original German texts. A review of *Architecture and the Crisis of Modern Science* by Robin Evans is presented in this issue of *9H*

14 ibid, p 7

15 ibid, p 8

16 ibid, p 19

17 ibid, p 10

18 ibid, p 10

19 ibid, p 19

20 ibid, p 22

21 ibid, p 10

22 There are, in fact, other senses in which phenomenology can be used. For example, the phenomenology of Ernest Cassirer has more in common with structuralism than with the phenomenology of Husserl. This is because Cassirer is concerned with the analysis of projections of consciousness into the real world by symbols, languages, myths and other artefacts, rather than with the allegedly irreducible content of the subjective consciousness itself. One must always distinguish such 'phenomenology of the object' (which, properly speaking, all formal theories of architecture are) from the more common and usually mystical 'phenomenology of the subject'.

23 E Husserl: article on 'Phenomenology' for the *Encyclopedia Britannica*, 1927; revised translation by RE Palmer in *Husserl: Shorter Works*, eds McCormick & Elliston, Harvester Press, 1981

24 KR Popper: *The Logic of Scientific Discovery*, Hutchinson, 3rd edition, 1968, p 111

25 Vitruvius: *The Ten Books of Architecture*, in the translation by MH Morgan, Dover, 1960

26 ibid, pp 24-31

27 ibid, p 73

28 ibid, pp 252-253

29 see note 18

30 Vitruvius: op cit, pp 168-169

31 Eds Hamilton & Cairns: *Plato: The Collected Dialogues*, Princeton University Press, 1961. This is the standard edition of the Dialogues, but in the main, quotations are taken from the translation by HPD Lee, Penguin, 1977, p77

32 One major exception is Reyner Banham in this *Theory and Design in the First Machine Age*, The Architectural Press, 1960, where he refers throughout to the Phileban — rather than the Platonic — solids.

33 Plato: *Philebus*, translated by B Jowett, Sphere Books, 1970, pp 98-99

34 J Piaget: *The Mechanisms of Perception*, tranlated by GN Seagrim, Routledge, Kegan & Paul, 1969, p 356

35 The best account of the theory of intelligibility in set out in Plato's *The Republic*, translated by Cornford, Oxford University Press, 1941, pp 216-221

36 This might be termed a 'transpatial' notion since it quite specifically relates objects to each other independent of space. For a fuller discussion on the concept of the 'transpatial', see B Hillier & J Hanson: *The Social Logic of Space*, Cambridge University Press, 1984

37 ibid, p 37

38 Vitruvius, op cit, p 72

39 ibid, p 175

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